P #64 Ch. 2 - pg 53

a) $x = -23\,m$ (down)
$a = -9.8\,m/s^2$

$x_0 = 0\,m$
$v_0 = 0\,m/s$

$x = x_0 + v_0 t + \frac{1}{2} a t^2$

$x = \frac{1}{2} a t^2$

so

$(-23\,m) = \frac{1}{2}(-9.8\,m/s^2) \cdot t^2$

$t = 2.17\,sec$

b) $v_0 = 0\,m/s$
$t = 2.17\,sec$

$v = v_0 + a t$

$= 0\,m/s + (-9.8\,m/s^2)(2.17\,sec)$

$v = -21.2\,m/s$

c) $t_{total} = t_{jump} + t_{sound}$

$v_{sound} = 340\,m/s$
$x_{sound} = 23\,m$
$a_{sound} = 0\,m/s^2$

$x = x_0 + v_0 t + \frac{1}{2} a t^2$

$x = v_0 t$ so $(23\,m) = (340\,m/s) \cdot t$

$t_{sound} = .067\,sec$

$t_{total} = 2.17\,sec + .067\,sec$

$t_{total} = 2.24\,sec$